

**AMENDMENTS TO THE CLAIMS:**

This listing of claims will replace all prior versions, and listings, of claims in the application:

**Listing of Claims:**

Claim 1 (currently amended) An X-DSL transceiver configured to couple to at least one subscriber line to communicate at least one multi-tone modulated communication channel thereon; and the X-DSL transceiver comprising:

a digital signal processor (DSP) configured to couple to the at least one subscriber line for multi-tone modulation and demodulation of the at least one communication channel thereon, and the DSP operative during a training phase of the at least one multi-tone modulated communication channel to determine an available ~~bandwidth~~ range of frequencies on the at least one subscriber line and to expand or contract a tone spacing of each of a fixed number "N" of tones ~~of the multi-tone modulation and demodulation of the at least one communication channel~~ responsive to the determination; ~~of the available bandwidth;~~ and the DSP including:

- a Fourier transform module for transforming successive tone sets of the fixed number "N" of tones of the at least one multi-tone modulated communication channel between a frequency domain and a time domain, and the Fourier transform module responsive to the determination to expand the tone spacing by decreasing a processing interval associated with the transformation of each successive tone set between the time and frequency domains and further responsive to the determination to contract the tone spacing by increasing the processing interval associated with the transformation of each successive tone set between the time and frequency domains; ~~whereby the tone spacing utilized for modulation and demodulation of a fixed number of tones of the at least one multi-tone modulated communication channel varies at least in part based on a length of the at least one subscriber line. ; and~~

at least one analog front end (AFE) coupled between the at least one subscriber line and the DSP and the at least one AFE configured to perform analog-to-digital and digital-to-analog conversion of the at least one multi-tone modulated communication channel at rates

compatible with the processing interval of the Fourier transform module; whereby the range of frequencies spanned on the subscriber line between a lowest frequency one and a highest frequency one of the fixed number "N" of modulated tones of the at least one communication channel includes either a first range of frequencies associated with expanded spacing of each of the "N" tones and generally associated with a short subscriber line or a second, relatively narrower, range of frequencies associated with contracted spacing of each of the "N" tones and generally associated with a relatively long subscriber line.

Claim 2 (currently amended) The X-DSL transceiver of Claim 1, wherein the at least one AFE further ~~comprising~~ comprises:

a digital-to-analog converter (DAC) coupled to the at least one subscriber line and performing a digital-to-analog conversion of the at least one multi-tone modulated communication channel at a fixed sample rate; and

an interpolator coupling the DSP to the DAC, and the interpolator configured to vary an amount of interpolation of the at least one multi-tone modulated communication channel in direct correspondence with a duration of the corresponding processing interval selected by the DSP, whereby tone sets processed in the DSP at the relatively shorter duration processing interval will be subject to relatively smaller amounts of interpolation and vice versa, thereby allowing the DAC to maintain the fixed sample rate.

Claim 3 (currently amended) The X-DSL transceiver of Claim 1, wherein the at least one AFE further ~~comprising~~ comprises:

an analog-to-digital converter (ADC) coupled to the at least one subscriber line and performing an analog-to-digital conversion of the at least one multi-tone modulated communication channel at a fixed sample rate; and

a decimator coupling the ADC and to the DSP, and the decimator configured to vary an amount of decimation of the at least one multi-tone modulated communication channel in direct correspondence with a duration of the corresponding processing interval selected by the DSP, whereby tone sets processed in the DSP at the relatively shorter duration processing interval will be subject to relatively smaller amounts of decimation and vice versa, thereby allowing the ADC to maintain the fixed sample rate.

Claim 4 (currently amended) The X-DSL transceiver of Claim 1, wherein the at least one subscriber line comprises a plurality of subscriber lines and the at least one multi-tone modulated communication channel comprises a plurality of multi-tone modulated communication channels each associated with a corresponding one of the plurality of subscriber lines; and further comprising:

the DSP configured to independently select for each of the plurality of multi-tone modulated communication channels a corresponding processing interval which inversely corresponds with the available ~~bandwidth~~ range of frequencies on the associated one of the plurality of subscriber lines.

Claim 5 (previously presented) The X-DSL transceiver of Claim 1, wherein the DSP supports modulation and demodulation of the at least one multi-tone modulated communication channel in a plurality of multi-tone protocols.

Claim 6 (currently amended) The X-DSL transceiver of Claim 1, wherein the at least one AFE further comprising: ~~comprising:~~ comprises:

a digital-to-analog converter (DAC) coupled to the DSP and the at least one subscriber line and the DAC performing a digital-to-analog conversion of the at least one multi-tone modulated communication channel at a sample rate which corresponds inversely with respect to the processing interval selected by the DSP; and

an analog-to-digital converter (ADC) coupled to the communication medium and the DSP and the ADC performing an analog-to-digital conversion of the at least one multi-tone modulated communication channel at the sample rate which corresponds inversely with respect to the processing interval selected by the DSP.

Claim 7 (currently amended) The X-DSL transceiver of Claim 1, wherein the at least one subscriber line comprises a plurality of subscriber lines and the at least one multi-tone modulated communication channel comprises a plurality of multi-tone modulated communication channels each associated with a corresponding one of the plurality of subscriber lines; and further comprising:

the DSP configured to independently select for each of the plurality of multi-tone modulated communication channels a corresponding processing interval which inversely corresponds with the available ~~bandwidth~~ range of frequencies on the associated one of the plurality of subscriber lines; and

a scheduler coupled to the DSP to schedule processing therein of the plurality of multi-tone modulated communication channels based on criteria including associated processing intervals for each of the plurality of multi-tone modulated communication channels.

Claims 8-16 (canceled)

Claim 17 (currently amended) A method in an X-DSL transceiver for communicating at least one multi-tone modulated communication channel across a subscriber line; and the method comprising the acts of:

determining during a training phase of the at least one multi-tone modulated communication channel an available ~~bandwidth~~ range of frequencies on the at least one subscriber line;

selecting an expanded or contracted tone spacing for each successive set of a fixed number "N" tones associated with the modulation and demodulation of the at least one multi-tone modulated communication channel responsive to the available bandwidth range of frequencies determined in the determining act;

transforming successive tone sets of the fixed number "N" tones of the at least one multi-tone modulated communication channel between a frequency domain and a time domain;

responding to the selection of an expanded tone spacing in the selecting act by decreasing a processing interval associated with the transformation of each successive tone set between the time and frequency domains; and

responding to the selection of a contracted tone spacing in the selecting act by increasing a processing interval associated with the transformation of each successive tone set between the time and frequency domains; ~~whereby the tone spacing utilized for modulation and demodulation of a fixed number of tones of the at least one multi-tone modulated communication channel varies at least in part based on a length of the at least one subscriber line.~~

performing analog-to-digital and digital-to-analog conversion of the at least one multi-tone modulated communication channel at rates compatible with the processing interval established in the corresponding one of the responding acts; whereby the range of frequencies spanned on the subscriber line between a lowest frequency one and a highest frequency one of the fixed number "N" of modulated tones of the at least one communication channel includes either a first range of frequencies associated with expanded spacing of each of the "N" tones and generally associated with a short subscriber line or a second, relatively narrower, range of frequencies associated with contracted spacing of each of the "N" tones and generally associated with a relatively long subscriber line.

Claim 18 (new) The method of Claim 17, wherein the expanded tone spacing of the first responding act substantially corresponds to a 8.625 kHz and the contracted tone spacing of the second responding act substantially corresponds to a 4.3125 kHz tone spacing.

Claim 19 (new) The method of Claim 1, wherein the expanded tone spacing of each of the modulated tones substantially corresponds to a 8.625 kHz and the contracted tone spacing of each of the modulated tones substantially corresponds to a 4.3125 kHz tone spacing.